IN THE CLAIMS:

Please amend claims 2, 3 and 7, as shown below, in which insertions are indicated by underline and deletions are indicated with strikethrough and/or double brackets. This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Previously presented) A method for measuring a position of an object according to an image of the object captured by a camera unit, the method comprising the steps of:

calculating a discrepancy of an incident beam of light penetrating a lens system of the camera unit relative to an optical center of the lens system; and

compensating the position of the object according to the discrepancy;

wherein a distance between the object and the camera unit is not known prior to measuring the position of the object;

wherein the incident beam of light is directly projected from the object to the lens system; and

wherein said discrepancy is a minimum distance between the optical center and said incident beam of light.

2. (Currently amended) A method for measuring a position of an object with a combination of an image of the object captured by a camera unit and calibration information, the calibration information being prepared in advance in such a manner that a position of a measurement pixel

of the image is correlated with a direction of an incident beam of light and a displacement from a reference point to the incident beam, the method comprising the steps of:

(a) incorporating the image;

(b) detecting a position of a pixel representative of the object in the image incorporated at step (a); and

(c) calculating the position of the object according to the direction and the displacement of the incident beam, which are obtained from the calibration information with reference to the position of the pixel detected at step (b);

wherein the displacement of the incident beam of light relative to the reference point is a discrepancy of the incident beam of light relative to an optical center of a lens of the camera unit; [[and]]

wherein said discrepancy is a minimum distance between the optical center and said incident beam of light<u>;</u>

<u>wherein the incident beam of light is directly projected from the object to the lens of the camera unit; and</u>

<u>wherein the position of the object is compensated according to said discrepancy</u>.

3. (Currently amended) An apparatus for measuring a position of an object according to an image of the object captured by a camera unit, the apparatus comprising:

an image input means for incorporating the image;

a pixel position detection means for detecting a position of a pixel representative of the object in the image incorporated by the image input means;

a storage means for storing calibration information which correlates the position of the pixel with both a direction of an incident beam of light originating from the object and a displacement from a reference point to the incident beam; and

a position calculation means for calculating the position of the object according to the direction and the displacement of the incident beam, which are derived from the calibration information with reference to the position of the pixel detected by the pixel position detection means ;

wherein said displacement of the incident beam indicates a discrepancy of the incident beam of light penetrating a lens system of the camera unit relative to an optical center of the lens system; [[and]]

wherein said discrepancy is a minimum distance between the optical center of the lens system and said incident beam of light;

wherein said incident beam of light is directly projected from the object to the lens system of the camera unit; and

wherein the position of the object is compensated according to said discrepancy.

4. (Previously presented) The apparatus according to claim 3, wherein the camera unit comprises cameras in sets of at least two so as to take a plurality of images and the storage means stores the calibration information for each of said cameras.

5. (Original) The apparatus according to claim 3, wherein the pixel position detection means detects the position of the pixel representative of the object having a marker identifying a typical spot of the object.

6. (Withdrawn, original) The apparatus according to claim 3 further comprising a floodlight which projects a collimated beam of light on the object, wherein the camera unit captures an image of the object illuminated by the collimated beam, and the apparatus measures the position of the object according to spatial relationship between a position of the floodlight and an optical center of the camera unit as well as a position of the collimated beam on the image.

7. (Currently amended) A computer-readable medium comprising a computer program for a computer used for an apparatus which generates calibration information correlating a position of a measurement pixel of an image captured by a camera unit, with a direction of the incident beam of light and a displacement from a reference point to the incident beam of light, and measures a position of an object according to an image of the object captured by the camera unit,

and the calibration information, when executed by a computer used for an apparatus, causes the computer to perform the process steps of:

(a) incorporating the image of the object;

(b) detecting a position of a pixel representative of the object in the image incorporated at process (a); and

(c) calculating the position of the object according to the direction and the displacement of the incident beam of light, which are derived from the calibration information with reference to the position of the pixel detected at process (b);

wherein said incident beam of light is directly projected from the object to a lens system of the camera unit; and wherein said reference point is an optical center of the lens system; [[and]]

wherein said displacement of the incident beam of light from the reference point is a discrepancy of the incident beam of light relative to the optical center of the lens of the camera unit; [[and]]

wherein said discrepancy is a minimum distance between the optical center and said incident beam of light; and

wherein the position of the object is compensated according to the discrepancy.

8. (Withdrawn, original) A method for generating calibration information comprising the steps of:

projecting a beam of light on individual pixels of a camera image;

according to the beam of light incident on each pixel, calculating a displacement from a reference point to the incident beam of light; and

generating the calibration information by correlating a direction and the displacement of the incident beam of light with a position of each pixel.

9. (Withdrawn, original) A method for generating calibration information comprising the steps of:

adjusting a first direction of a camera unit so that a first peak intensity of light emitted by a light source falls in a measurement pixel captured by the camera unit, and measuring a first relative position of the light source relative to the camera unit;

adjusting a second direction of the camera unit so that a second peak intensity of light emitted by the light source falls in the measurement pixel, and measuring a second relative position of the light source relative to the camera unit;

repeating determination of an incident beam of light impinging on the measurement pixel according to the first and second relative positions for predetermined measurement pixels;

calculating a displacement from a reference point to the incident beam of light for each of the measurement pixels; and

generating the calibration information which correlates a direction and the displacement

of the incident beam of light with each of the measurement pixels.

10. (Previously Presented) A method for measuring a position of an object according to claim 1, wherein said discrepancy calculating step involves use of calibration information prepared in advance, wherein said method further involves generating said calibration information in the steps of:

projecting a beam of light on individual pixels of a camera image;

according to the beam of light incident on each pixel, calculating a displacement from a reference point to the incident beam of light; and

generating the calibration information by correlating a direction and the displacement of the incident beam of light with a position of each pixel.

11. (Previously Presented) A method for measuring a position of an object according to claim 1, wherein said discrepancy calculating step involves use of calibration information prepared in advance, wherein said method further involves generating said calibration information in the steps of:

adjusting a first direction of the camera unit so that a first peak intensity of light emitted by a light source falls in a measurement pixel captured by the camera unit, and measuring a first relative position of the light source relative to the camera unit;

adjusting a second direction of the camera unit so that a second peak intensity of light emitted by the light source falls in the measurement pixel, and measuring a second relative position of the light source relative to the camera unit;

repeating determination of an incident beam of light impinging on the measurement pixel according to the first and second relative positions for predetermined measurement pixels;

calculating a displacement from a reference point to the incident beam of light for each of the measurement pixels; and

generating the calibration information which correlates a direction and the displacement of the incident beam of light with each of the measurement pixels.

12. (Previously presented) A method according to claim 1, wherein the camera unit is adapted to be positioned on an automobile.

13. (Previously presented) A method according to claim 2, wherein the camera unit is adapted to be positioned on an automobile.

14. (Previously presented) A method according to claim 3, wherein the camera unit is adapted to be positioned on an automobile.